COVID-19 NATIONAL TESTING PROGRAMME SERVICE EVALUATION EVIDENCE REPORT

This report documents that a service evaluation was conducted on behalf of the Department of Health and Social Care, England (DHSC), intending to either support or refute the hypothesis detailed below in relation to the COVID-19 national testing programme. Details of the nature of the experiment, the hypothesis, conducting labs, results and policy recommendation from the result are included below.

Experiment ID	SE-SWTC3
Date Experiment Requested	30/04/20
Control used for experiment	Throat and nose swabs collected by trained operator qRT-PCR controls at [redacted]
Protocol version	1
Type of validation	Service Evaluation
Hypothesis	Composite kit composed of a Medline MD202003 dry swab and a vial of 0.85% saline is suitable for use in self-swabbing collection of samples for COVID-19 antigen test-based diagnosis.
What product being tested	Medline MD202003 dry swab with vial of 0.85% saline
What time incubation	• Up to 24 hours post swab collection
Objectives	<u>Primary objective</u> • To determine whether self-swabbing is as effective as swabs taking by trained operators[1] for diagnosing SARS-CoV-2 positive patients. <u>Secondary Objective</u> • To determine whether these combination kits are suitable for binding and elution of SARS CoV-2 without RNA degradation for up to 24 hours at room temperature.

Details of the experiment including the conducting lab, time frames, results and additional observations of the experiment are detailed below.

Date Experiment Started	06/05/20
Experiment Conducting Lab	[redacted] and [redacted]
Date Experiment Completed	07/05/20
Inclusion criteria	• Subjects have agreed to take part in the self-swabbing exercise and are ≥18 years old • Subjects have read and understood the self-swabbing instructions. • Minimum of 50% of cohort to be composed of individuals who do not have experience of performing medical procedures
Summary of methods	1. Subject will swab their throat and nose according to the self-swabbing instructions. Swabbing will be monitored by a trained testing operator and technique will be noted in the case report form. The swab will be placed in the viral transport medium. 2. 4 identical barcodes will be produced and these should be:

	a. One attached to the tube with the self-swab b. One attached to the bag holding the self-swab tube c. One attached to the case report form d. One given to the subject 3. A trained testing operator will swab the patient's throat and nose according to standard diagnostic requirements and placed into the viral transport medium. 4. 4 identical barcodes will be produced and these should be: a. One attached to the tube with the assisted-swab b. One attached to the bag holding the assisted-swab tube c. One attached to the case report form d. One given to the subject 5. The samples will be collated and sent to [redacted] with the case report forms at the end of the day for processing using the standard diagnostic workflow. Samples will be stored and transported together, and run together on the same qRT-PCR plate. [redacted] workers will be blinded to: a. Which samples belong to which subject b. The collection mode of the sample 6. qRT-PCR Ct value data for the samples will be sent to Workstream 2 for unblinding, matching to electronic case report forms and analysis.
Results (high level summary report)	• A total of 397 subjects were successfully recruited into the Service Evaluation, and 397 pairs of swabs were taken. ○ 42 complete pairs did not arrive at the [redacted] for qRT-PCR analysis (SE062) in time to be included in the analysis. 355 pairs of samples were then subjected to qRT-PCR analysis. • 8/355 (2%) of swabs were reported as 'invalid' following qRT-PCR analysis (i.e. a non-concordant positive or negative result was obtained across the 3 SARS-CoV-19 genes assayed). Four of these were from self-swab samples. The matched assisted swab results for these 4 individuals were 1 positive and 3 negative diagnoses. The other 4 invalid samples were from assisted-swab samples. The matched self-swab results for these 4 individuals were all negative diagnoses. • The remaining 347 pairs of samples were complete and were analysed. • Overall 334 of 347 (96.3%%; 95% confidence interval: 93.6%-98.0%) subjects were concordant for positive or negative diagnosis. ○ 318 of these were diagnosed as COVID-19 negative ○ 16 of these were diagnosed as COVID-19 positive

	○ 13 of 355 subjects had discordant results across both samples, of whom: § 10 would be diagnosed as COVID-19 positive according to the self-collected sample, and as COVID-19 negative according to the assisted-test sample § 3 would be diagnosed as COVID-19 negative according to the self-collected sample, and as COVID-19 positive according to the assisted-test sample ○ For these subjects, there was no significant difference between the swabbing method, according to the confidence interval of proportion of assisted swabs being negative in discordant pairs (0.46-0.95; P=0.09). • In order to obtain more information on possible differences between self-swabbing and assisted swabbing, the quantitative Ct results were analysed. The results are shown in Appendix 1. ○ Results were divided (arbitrarily) into high viral load (Ct<25); low viral load (Ct>=25 & Ct<35) and undetectable. Note that 1 self Ct value was above 35 (36.4) ○ Quantitative CT concordance was 329/349 (94.3%; 95% confidence interval; 92.5%-97.0%) ○ There were 18 pairs of samples that were discordant for quantitative Ct result. Of these, 14 had a higher viral load in the self-swab sample and 4 had a higher viral load in the assisted swab sample. • Of note, when the quantitative viral load was compared between samples in for the 16 subjects diagnosed as COVID-19 positive across both samples, the self-swabbing results were higher than the assisted swabs. The mean Ct difference between a subject's samples (assisted swab minus self-swab) was 1.59; 95% confidence interval: 0.2 – 3.0, P=0.028). A Ct difference of 1.59 corresponds to about a 3 fold higher viral load. A scatter plot of these Ct values is given in Appendix 2
Additional Observations	
Summary of conclusions	• Overall there is strong evidence that self-swabbing is not materially inferior to assisted swabbing. There is no evidence that self-swab have more failures or negative swabs than assisted swabs. There is some evidence that self-swabbing might provide higher viral loads in positive swabs.
Supporting graphs / data (to attach in the appendix)	Appendix 1 (Quantitative Ct data analysis) Appendix 2 (Ct scatter plot for concordant positive subjects)

Policy recommendation from this data (to be completed by DHSC)	The current approach of self and assisted swabbing should continue. In conjunction with the separate evidence of length of time in which swab samples remain viable for up to 10 days on the swab (see Validation Evidence Report SWTC008c) it is appropriate that this swab/medium combination is used in the home testing service.

	The data from this service evaluation should be used to support the MHRA derogation for use in home swabbing A larger service evaluation of self versus assisted swabbing should be undertaken. This should be coordinated to additionally meet data requirements for the MHRA approval of different kit types to be used for both self and assisted swabbing.

The signatures below confirm that requesting authority is satisfied that the experiment was conducted was conducted successfully (regardless of outcome) and that the above details are complete and correct.

[redacted]

Requesting Authority (10/05/20202)

[redacted]

[redacted]

[redacted]

Conducting Group (10/05/2020)

[redacted]

University of Oxford

(1) Corrected from "Health Care Worker"

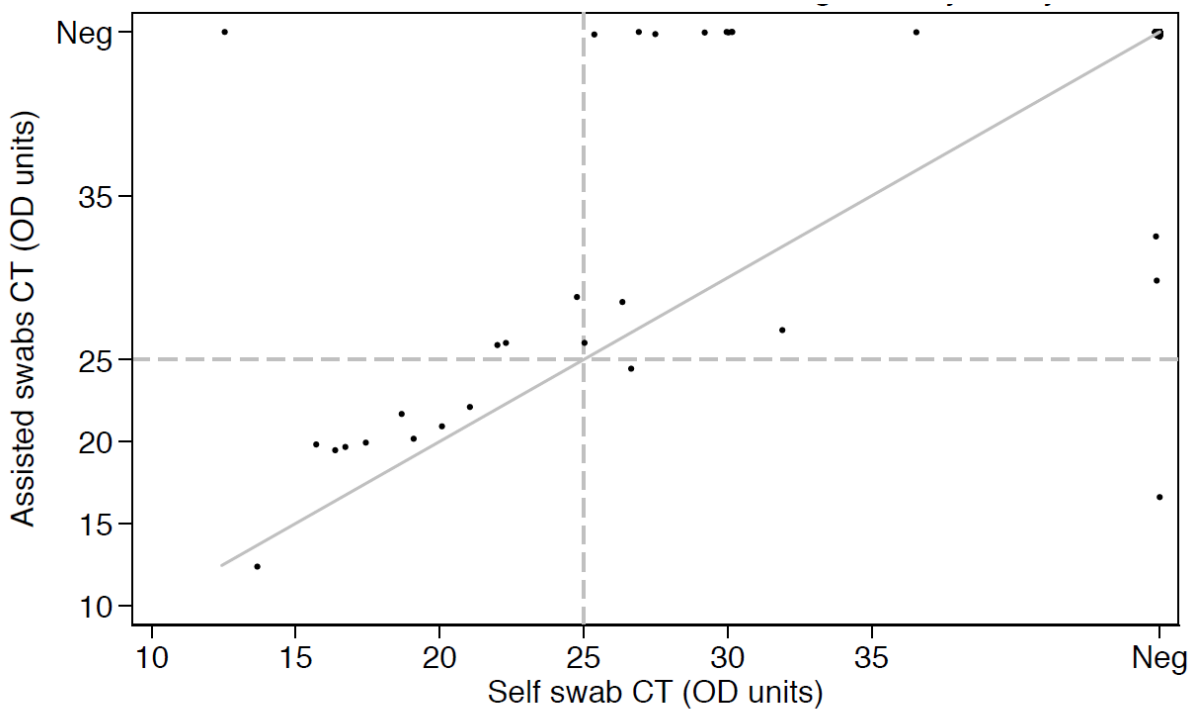
SE-SWTC1 - Appendix 1

Quantitative Ct data analysis

	Assisted CT groups			
Self-swabs CT groups	**<25 (High viral load**	**>=25 - <37 (Low viral load)**	**Undetectable viral load**	**Total**
<25 (high viral load)	9	4	1	14
>=25 – 37 (low viral load)	1	2	9	12
Undetectable	1	2	318	321
Total	**11**	**8**	**328**	**347**

SE-SWTC1 - Appendix 2

Scatter Plot of quantitative Ct results from concordant positive subjects



Results from 347 pairs of swabs; 318 were both negative